IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Monga Application No.: 09/930097 Filed: 08/15/2001 Title: System, Device and Method for Bandwidth Management in an Optical Communication System Attorney Docket No.: 120-176 14984BAUS01U	Group Art Unit: 2457 Examiner: Dalencourt

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APPEAL BRIEF

Sir:

Please enter this Appeal Brief pursuant to the Notice of Appeal filed on September 23, 2008 and the Notice of Panel Decision from Pre-Appeal Brief Review dated November 7, 2008.

I. **<u>Real Party in Interest</u>**

The real party in interest is Nortel Networks Limited.

II. **<u>Related Appeals and Interferences</u>**

Appellants are not aware of any related appeals or interferences.

III. **<u>Status of the Claims</u>**

Claims 1-36 are pending in this application. All of the pending claims are rejected. The claims are listed in appendix A. The rejections of independent claims 1, 12, 24, and 31 are the subject of this appeal.

IV. **<u>Status of Amendments</u>**

All submitted amendments have been entered and considered.

V. **<u>Summary of Claimed Subject Matter</u>**

The presently claimed invention is directed to bandwidth management in an optical network. An all-optical network is one in which both transport and processing of traffic occur in the optical domain. It has long been known to use optical links to connect nodes which process traffic in the electrical domain. So-called "OEO" (optical-electrical-optical) nodes have optical ports, but must convert signals to the electrical domain for processing. While processing in the electrical domain permits buffering, IP/MPLS routing, and other features that are not presently practical in the optical domain, the conversion from optical to

electrical and back to optical is costly if none of those electrical domain features are required. A so-called "OOO" (optical-optical-optical) node avoids the conversions to and from the electrical domain, e.g., by using an optical cross-connect (OXC). In either case, the links between the nodes are optical. Despite the development of OOO nodes, provisioning remains slow and typically requires human intervention, e.g., a technician at a remote console entering commands to configure OOO nodes to establish an optical path. More agile provisioning and bandwidth management would enable various new features and services, some of which are described in the specification.

The limitations recited in the independent claims are supported by the specification as indicated below in bold.

1. (previously presented) Apparatus for providing bandwidth management services for a user in an optical communication system, comprising:

an optical service agent

An optical service agent (OSA) operating within the domain of the network user manages communication connections on behalf of the network user. Page 6, lines 14-16.

including:

an application programming interface operative to receive input from a user application indicative of application-specific bandwidth management service requirements;

The OSA 610 provides an OSA API through which the user application 710 can access the OSA 610. Page 15, lines 2-3. The OSA-A is the application piece of the OSA 610. The OSA-A implements application-specific services and intelligence. Page 15, lines 14-15.

a user-to-network interface (UNI) for interfacing with an optical communication network in which data is processed and transported only in optical form;

In order for the users 110, 130 to control and monitor communication services from the ASON 120, the ASON controller provides a user-to-network interface (UNI) through which the users 110, 130, interact with the ASON controller for controlling and monitoring communication services within the ASON 120. Page 8, lines 11-15. The ASON includes optical cross-connect switches (OXCs) that are used to form the mesh network. Page 7, lines 5-6.

a peer-to-peer interface for interfacing with peer users;

The peer-to-peer signaling logic 2060 enables the OSA-enabled user to communicate with other OSA-enabled users within a user network and/or across the ASON 120. Page 27, lines 11-13. The auto-discovery logic 2040 enables the OSA-enabled user to automatically discover peer OSA-enabled users within a user network and/or across the ASON 120. Page 27, lines 18-20. The peer authentication logic 2070 enables the OSA-enabled user to authenticate peer OSA-enabled users. Page 27, lines 27-28. and

optical service logic for interacting with the application programming interface and the optical communication network via the UNI and with the peer users via the peer-to-peer interface for providing said application-specific bandwidth management services for the user, including provision of a new optical communication path between specified nodes in the optical communication network;

The optical service logic 2020 implements application-specific services and intelligence. The optical service logic interacts with the ASON 120 via the ASON UNI 2050. The optical service logic 2020 also interacts with other OSA-enabled users via the peer-to-peer signaling logic 2060. Page 27, lines 4-7. The OSA can negotiate various connection and connection-related services on behalf of the user … establish a connection for the user, and aggregate multiple optical communication paths over a connection. Page 34, lines 19-23. and

an optical service server operative to authenticate the user, obtain network topological information, and to employ the network topological information on behalf of the optical service agent for providing bandwidth management services such that the network topological information is not exposed to the user.

In the client-server architecture, most of the OSA-N functionality, including authentication, registration, and group membership, is handled by an optical service server (OSS), as shown in FIG. 12. The OSS maintains authentication, registration, and group membership information for multiple

OSA-enabled devices. The OSA-enabled user is typically pre-configured with a group identifier. When the OSA-enabled user is attached to the ASON 120, the OSA-N sends a registration message to the OSS. The OSA-N includes its group identifier in the registration message. The OSS stores the group identifier in its registration database. The OSA-N queries the OSS to obtain group membership information that includes the identity and location of peer users. Page 18, lines 24 through page 19, line 2.

12. (previously presented) A device comprising:

a user application requiring communication services from an optical communication network in which data is processed and transported only in optical form;

The OSA 610 provides an OSA API through which the user application 710 can access the OSA 610. Page 15, lines 2-3. The ASON includes optical cross-connect switches (OXCs) that are used to form the mesh network. Page 7, lines 5-6. and

an optical service agent operative in response to signaling from the user application for communicating with the optical communication network and providing application-specific optical communication network bandwidth management services for the user application, including provision of a new optical communication path between specified nodes in the optical communication network;

An optical service agent (OSA) operating within the domain of the network user manages communication connections on behalf of the network user. Page 6, lines 14-16. The OSA 610 provides an OSA API through which the user application 710 can access the OSA 610. Page 15, lines 2-3. The OSA-A is the application piece of the OSA 610. The OSA-A implements application-specific services and intelligence. Page 15, lines 14-15. and

an optical service server operative to authenticate the user application and to obtain network topological information which is employed on behalf of the optical service agent for providing bandwidth management services such that the network topological information is not exposed to the user application

In the client-server architecture, most of the OSA-N functionality, including authentication, registration, and group membership, is handled by an optical service server (OSS), as shown in FIG. 12. The OSS maintains authentication, registration, and group membership information for multiple OSA-enabled devices. The OSA-enabled user is typically pre-configured with a group identifier. When the OSA-enabled user is attached to the ASON 120, the OSA-N sends a registration message to the OSS. The OSA-N includes its group identifier in the registration message. The OSS stores the group identifier in its registration database. The OSA-N queries the OSS to obtain group membership information that includes the identity and location of peer users. Page 18, lines 24 through page 19, line 2.

24. (previously presented) A system comprising:

an optical communication network in which data is processed and transported only in optical form;

The ASON includes optical cross-connect switches (OXCs) that are used to form the mesh network. Page 7, lines 5-6.

a first network user coupled to the optical communication network, wherein the first network user comprises an optical service agent operative in response to signaling from a user application to obtain application-specific optical communication services from the optical communication network via a user-to-network interface (UNI) communicating with the optical communication network and for providing application-specific bandwidth management services for the first network user, including provision of a new optical communication path between specified nodes in the optical communication network;

The OSA 610 provides an OSA API through which the user application 710 can access the OSA 610. Page 15, lines 2-3. The OSA-A is the application piece of the OSA 610. The OSA-A implements application-specific services and intelligence. Page 15, lines 14-15. In order for the users 110, 130 to control and monitor communication services from the ASON 120, the ASON controller provides a user-to-network interface (UNI) through which the users 110, 130, interact with the ASON controller for controlling and monitoring communication services within the ASON 120. Page 8, lines 11-15. The OSA can negotiate various connection and connection-related

services on behalf of the user ... establish a connection for the user, and aggregate multiple optical communication paths over a connection. Page 34, lines 19-23.

and

an optical service server operative to authenticate the first network user and to obtain network topological information which is employed on behalf of the optical service agent for providing bandwidth management services such that the network topological information is not exposed to the first network user **In the client-server architecture, most of the OSA-N functionality, including authentication, registration, and group membership, is handled by an optical service server (OSS), as shown in FIG. 12. The OSS maintains authentication, registration, and group membership information for multiple OSA-enabled devices. The OSA-enabled user is typically pre-configured with a group identifier. When the OSA-enabled user is attached to the ASON 120, the OSA-N sends a registration message to the OSS. The OSA-N includes its group identifier in the registration message. The OSS stores the group identifier in its registration database. The OSA-N queries the OSS to obtain group membership information that includes the identity and location of peer users. Page 18, lines 24 through page 19, line 2**.

31. (previously presented) A method for managing bandwidth for a user in an optical communication system in which data is processed and transported only in optical form, the-method comprising:

monitoring bandwidth utilization by an optical service agent in the user on a connection in the optical communication system;

Beginning at block 2402, the OSA may monitor bandwidth utilization on a connection, in block 2404 (FIG. 24). Page 36, lines 31-32.

controlling bandwidth utilization by an optical service agent in the user on a connection in the optical communication system in response to signaling from a user application to provide application-specific bandwidth utilization control;

The OSA may control bandwidth utilization on a connection, in block 2406. Page 36, line 32 through page 37, line 1. The OSA 610 provides an OSA API through which the user application 710 can access the OSA 610. Page 15, lines 2-3. The OSA-A is the application piece of the OSA 610. The OSA-A implements application-specific services and intelligence. Page 15, lines 14-15. In order for the users 110, 130 to control and monitor communication services from the ASON 120, the ASON controller provides a user-to-network interface (UNI) through which the users 110, 130, interact with the ASON controller for controlling and monitoring communication services within the ASON 120. Page 8, lines 11-15. The OSA can negotiate various connection and connection-related services on behalf of the user … establish a connection for the user, and aggregate multiple optical communication paths over a connection. Page 34, lines 19-23.

obtaining additional bandwidth by an optical service agent in the user for a connection in the optical communication system in response to

signaling from the user application to provide application-specific additional bandwidth, including provision of a new optical communication path between specified nodes in the optical communication system;

The OSA may obtain additional bandwidth for a connection, in block 2408. Page 37, lines 1-2. The OSA 610 provides an OSA API through which the user application 710 can access the OSA 610. Page 15, lines 2-3. The OSA-A is the application piece of the OSA 610. The OSA-A implements application-specific services and intelligence. Page 15, lines 14-15. In order for the users 110, 130 to control and monitor communication services from the ASON 120, the ASON controller provides a user-to-network interface (UNI) through which the users 110, 130, interact with the ASON controller for controlling and monitoring communication services within the ASON 120. Page 8, lines 11-15. The OSA can negotiate various connection and connection-related services on behalf of the user … establish a connection for the user, and aggregate multiple optical communication paths over a connection. Page 34, lines 19-23.

relinquishing unused bandwidth by an optical service agent in the user for a connection in the optical communication system in response to signaling from the user application to provide application-specific relinquishing of bandwidth;

The OSA may relinquish unused bandwidth for a connection in block 2410. Page 37, lines 2-3. The OSA 610 provides an OSA API through which the user application 710 can access the OSA 610. Page 15, lines 2-3. The OSA-A

is the application piece of the OSA 610. The OSA-A implements application-specific services and intelligence. Page 15, lines 14-15. In order for the users 110, 130 to control and monitor communication services from the ASON 120, the ASON controller provides a user-to-network interface (UNI) through which the users 110, 130, interact with the ASON controller for controlling and monitoring communication services within the ASON 120. Page 8, lines 11-15. The OSA can negotiate various connection and connection-related services on behalf of the user … establish a connection for the user, and aggregate multiple optical communication paths over a connection. Page 34, lines 19-23. and

allocating bandwidth by an optical service agent among multiple connections in the optical communication system,

The OSA may allocate bandwidth among multiple connections in block 2412. Page 37, lines 3-4.

prior to which an optical service server executes the following steps:

authenticating the user;

obtaining network topological information; and

employing the network topological information on behalf of the optical service agent to provide bandwidth management services such that the network topological information is not exposed to the first network user.

In the client-server architecture, most of the OSA-N functionality, including authentication, registration, and group membership, is handled by an optical service server (OSS), as shown in FIG. 12. The OSS maintains

authentication, registration, and group membership information for multiple OSA-enabled devices. The OSA-enabled user is typically pre-configured with a group identifier. When the OSA-enabled user is attached to the ASON 120, the OSA-N sends a registration message to the OSS. The OSA-N includes its group identifier in the registration message. The OSS stores the group identifier in its registration database. The OSA-N queries the OSS to obtain group membership information that includes the identity and location of peer users. Page 18, lines 24 through page 19, line 2.

VI. Grounds of Rejection to be Reviewed on Appeal

A. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,681,232 (Sistanizadeh) in view of US 6,728,484 (Ghani).

B. Claims 12 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,681,232 (Sistanizadeh) in view of US 6,728,484 (Ghani).

C. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,681,232 (Sistanizadeh) in view of US 6,728,484 (Ghani).

VII. <u>Argument</u>

A. The cited combination fails to describe an application programming interface operative to receive input from a user application indicative of application-specific bandwidth management service requirements as recited in claim 1.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

With regard to claim 1, the Examiner cites Sistanizadeh at column 2, lines 63-67; column 5, lines 54-67; column 6, lines 54-67; and column 7, lines 10-40 as describing the limitation of "an application programming interface operative to receive input from a user application indicative of application-specific bandwidth management service requirements." However, the cited passages fail to support the examiner's assertion because they specifically state that input is provided by a human being. For example, Sistanizadeh states at column 2, lines 50-52 that "the user interface is accessible both by *carrier staff personnel and by end-use customers*." (emphasis added). This point is reinforced at column 2, lines 63-67 which states that "the application also interacts with elements of the extended-area data communications network to control service traffic through the network, for example to increase a customer's bandwidth upon request *as input by the*

customer or by carrier staff." (emphasis added). Further, as stated at column 5, lines 61-64, "the *network operator* manages individual customer bandwidth at the network edge and ensures that all customers' CIR rates can be met by adequate provisioning of the backbone network." (emphasis added). Still further, as stated at column 6, lines 59-62, "the SLM 100 may be *accessed by carrier personnel*, for example at the network operations center (NOC) or by *customers*, using a web based interface and appropriate communications links." (emphasis added). Such statements show that the Sistanizadeh interface does not receive input from a user application, but rather from a user or other personnel.

This distinction discussed above is not trivial, and actually illustrates one of the advantages of the claimed invention. In particular, installing a new application and having the application itself request resources from the carrier network is faster and less prone to error as compared with having an enterprise IT person estimate required resources and contact carrier personnel to manually provision those resources. In other words, the invention helps to obviate the need for expert assistance and manual changes that typically involve both the customer and the carrier.

In addition to the points discussed above, it should also be noted that the applications described in Sistanizadeh are not "user applications" that require network services, but rather the server applications which monitor and control network services. The SLM cannot be reasonably interpreted as performing *both* the user application and optical service agent (OSA) functions. The significance of the distinction between the OSA and the user application is emphasized by the

claim limitation which recites that application-specific services are provided *by the OSA in response to signaling from the application.* As described in the specification with reference to Figure 6, the OSA (610) provides application-specific services.[1] Further, with reference to Figures 6 and 7, the OSA (610) includes an application programming interface (API) with various primitives for allowing a user application to access user-controllable and user-customizable features to prompt the OSA to provide the application-specific services.[2] In contrast, Sistanizadeh teaches that traffic requirements are defined and handled on the basis of traffic class.[3] Similarly, Ghani provides "channel (lightpath) provisioning for higher layer networking protocol clients such as IP, ATM, Frame Relay, and SONET/SDH."[4]

For the reasons stated above, the cited combination fails to suggest all of the limitations recited in claim 1 and the rejection should be reversed.

B. The cited combination fails to describe an optical service agent operative in response to signaling from the user application for communicating with the optical communication network and providing application-specific optical communication network bandwidth management services for the user application, including provision of a new optical

[1] page 13, line 20
[2] page 14, lines 21-27; page 15 lines 2-3
[3] column 6, lines 10-14
[4] column 7, lines 52-55

communication path between specified nodes in the optical communication network as recited in claims 12 and 24.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

With regard to claims 12 and 24, the Examiner cites Sistanizadeh at column 2, lines 63-67; column 5, lines 54-67; column 6, lines 54-67; and column 7, lines 10-40 as describing the limitation of "an optical service agent operative in response to signaling from the user application for communicating with the optical communication network and providing application-specific optical communication network bandwidth management services for the user application, including provision of a new optical communication path between specified nodes in the optical communication network." However, the cited passages fail to support the examiner's assertion because they specifically state that input is provided by a human being. For example, Sistanizadeh states at column 2, lines 50-52 that "the user interface is accessible both by *carrier staff personnel and by end-use customers*." (emphasis added). This point is reinforced at column 2, lines 63-67 which states that "the application also interacts with elements of the extended-area data communications network to control service traffic through the network, for example to increase a customer's bandwidth upon request *as input by*

the customer or by carrier staff." (emphasis added). Further, as stated at column 5, lines 61-64, "the *network operator* manages individual customer bandwidth at the network edge and ensures that all customers' CIR rates can be met by adequate provisioning of the backbone network." (emphasis added). Still further, as stated at column 6, lines 59-62, "the SLM 100 may be *accessed by carrier personnel*, for example at the network operations center (NOC) or by *customers*, using a web based interface and appropriate communications links." (emphasis added). Such statements show that the Sistanizadeh interface does not receive input from a user application, but rather from a user or other personnel. This distinction illustrates one of the advantages of the claimed invention. In particular, installing a new application and having the application itself request resources from the carrier network is faster and less prone to error as compared with having an enterprise IT person estimate required resources and contact carrier personnel to manually provision those resources. In other words, the invention helps to obviate the need for expert assistance and manual changes that typically involve both the customer and the carrier.

It should also be noted that the applications described in Sistanizadeh are not user applications that require network services, but rather the server applications which monitor and control network services. The SLM cannot be reasonably interpreted as performing both the user application and optical service agent (OSA) functions. The significance of the distinction between the OSA and the user application is emphasized by the claim limitation which recites that application-specific services are provided by *an optical service agent operative in*

response to signaling from the user application. As described in the specification with reference to Figure 6, the OSA (610) provides application-specific services.[5] Further, with reference to Figures 6 and 7, the OSA (610) includes an application programming interface (API) with various primitives for allowing a user application to access user-controllable and user-customizable features to prompt the OSA to provide the application-specific services.[6] In contrast, Sistanizadeh teaches that traffic requirements are defined and handled on the basis of traffic class.[7] Similarly, Ghani provides "channel (lightpath) provisioning for higher layer networking protocol clients such as IP, ATM, Frame Relay, and SONET/SDH."[8]

For the reasons stated above, the cited combination fails to suggest all of the limitations recited in claims 12 and 24, so the rejection should be reversed.

C. The cited combination fails to describe the combination of steps recited in claim 31.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in

[5] page 13, line 20
[6] page 14, lines 21-27; page 15 lines 2-3
[7] column 6, lines 10-14
[8] column 7, lines 52-55

judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

With regard to claim 31, the Examiner cites Sistanizadeh at column 1, lines 45-67 against monitoring bandwidth utilization by an optical service agent; column 11, lines 34-64 and column 15, lines 19-55 against controlling bandwidth utilization by an optical service agent; column 19, lines 1-35 against obtaining additional bandwidth by an optical service agent; column 21, lines 45-67 and column 22, lines 15-27 against relinquishing unused bandwidth and allocating bandwidth by an optical service agent. However, the cited passages fail to support the examiner's assertions because they fail to describe an optical service agent that performs all of the recited functions. In fact, the cited passages fail to even describe all of the functions, regardless of how provided. For example, the passage at column 1 simply describes a need for meeting QoS metrics. There is no suggestion of an agent for monitoring bandwidth utilization, or any other monitoring of bandwidth utilization. The passage at column 11 describes physical limitations on bandwidth and functions performed by network devices, but there is no suggestion of an optical service agent for controlling bandwidth utilization. Similarly, the passage at column 19 does not even describe obtaining additional bandwidth, whether by an optical service agent or otherwise. Rather, available bandwidth on an access ring is measured and dynamic performance metrics are computed and stored. The passages at columns 21 and 22 describe resource allocation, but there is no suggestion of relinquishing bandwidth. Note also that while the claim recites an optical service agent for performing functions on an

application-specific basis, Sistanizadeh operates on the level of the customer's overall service. At any given time a customer's service may be supporting multiple applications which are characterized by different requirements that may change over time. One problem with operating on the level of the customer's overall service is that resources are allocated so that the service as a whole satisfies the requirements of each supported application, i.e., a "least common denominator" approach. This typically results in wasted resources because each application only utilizes a fraction of the customer's overall service. For example, it is wasteful to provide a low latency guarantee for all applications if only one of many applications is sensitive to latency. It will therefore be appreciated that integrating the recited functions in a optical service agent that operates on an application-specific basis as recited in the claims results in more efficient use of network resources, and potentially saves the user the cost of those wasted resources.

It should also be noted that Sistanizadeh actually teaches away from the recited invention by specifically stating that input is provided by a human being. For example, Sistanizadeh states at column 2, lines 50-52 that "the user interface is accessible both by *carrier staff personnel and by end-use customers*." (emphasis added). This point is reinforced at column 2, lines 63-67 which states that "the application also interacts with elements of the extended-area data communications network to control service traffic through the network, for example to increase a customer's bandwidth upon request *as input by the customer or by carrier staff*." (emphasis added). Further, as stated at column 5,

lines 61-64, "the *network operator* manages individual customer bandwidth at the network edge and ensures that all customers' CIR rates can be met by adequate provisioning of the backbone network." (emphasis added). Still further, as stated at column 6, lines 59-62, "the SLM 100 may be *accessed by carrier personnel*, for example at the network operations center (NOC) or by *customers*, using a web based interface and appropriate communications links." (emphasis added). Such statements show that the Sistanizadeh interface does not receive input from a user application, but rather from a user or other personnel. This distinction illustrates one of the advantages of the claimed invention. In particular, installing a new application and having the application itself request resources from the carrier network is faster and less prone to error as compared with having an enterprise IT person estimate required resources and contact carrier personnel to manually provision those resources. In other words, the invention helps to obviate the need for expert assistance and manual changes that typically involve both the customer and the carrier.

For the reasons stated above the cited combination fails to describe all of the limitations of claim 31, and the rejection should be reversed.

VIII. Conclusion

The rejections are improper for at least the reasons set forth above. Appellants accordingly request that the rejections be reversed and the application put forward for allowance.

Respectfully submitted,

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Appendix A - Claims

1. (previously presented) Apparatus for providing bandwidth management services for a user in an optical communication system, comprising:

an optical service agent including:

an application programming interface operative to receive input from a user application indicative of application-specific bandwidth management service requirements;

a user-to-network interface (UNI) for interfacing with an optical communication network in which data is processed and transported only in optical form;

a peer-to-peer interface for interfacing with peer users; and

optical service logic for interacting with the application programming interface and the optical communication network via the UNI and with the peer users via the peer-to-peer interface for providing said application-specific bandwidth management services for the user, including provision of a new optical communication path between specified nodes in the optical communication network; and

an optical service server operative to authenticate the user, obtain network topological information, and to employ the network topological information on behalf of the optical service agent for providing bandwidth management services such that the network topological information is not exposed to the user.

2. (previously presented) The apparatus of claim 1, wherein the optical communication network comprises an automatically switched optical/transport network (ASON), and wherein the UNI comprises an ASON UNI.

3. (previously presented) The apparatus of claim 1, wherein the optical service logic comprises:

bandwidth monitoring logic for monitoring bandwidth utilization on a connection.

4. (previously presented) The apparatus of claim 1, wherein the optical service logic comprises:

bandwidth controlling logic for controlling bandwidth utilization on a connection.

5. (previously presented) The apparatus of claim 1, wherein the optical service logic comprises:

bandwidth obtaining logic for obtaining additional bandwidth for a connection.

6. (previously presented) The apparatus of claim 1, wherein the optical service logic comprises:

bandwidth relinquishing logic for relinquishing excess bandwidth for a connection.

7. (previously presented) The apparatus of claim 1, wherein the optical service logic comprises:

bandwidth allocation logic for allocating bandwidth among multiple connections.

8. (previously presented) The apparatus of claim 4, wherein the bandwidth controlling logic is operably coupled to prevent bandwidth utilization on the connection from exceeding a predetermined maximum bandwidth utilization.

9. (previously presented) The apparatus of claim 5, wherein the bandwidth obtaining logic is operably coupled to obtain the additional bandwidth for the connection upon determining that bandwidth utilization on the connection exceeds a predetermined level.

10. (previously presented) The apparatus of claim 6, wherein the bandwidth relinquishing logic is operably coupled to relinquish excess bandwidth for the connection upon determining that bandwidth utilization on the connection is below a predetermined level.

11. (previously presented) The apparatus of claim 7, wherein the bandwidth allocation logic is operably coupled to identify an over-utilized connection and an under-utilized connection and to transfer traffic from the over-utilized connection to the under-utilized connection.

12. (previously presented) A device comprising:

a user application requiring communication services from an optical communication network in which data is processed and transported only in optical form; and

an optical service agent operative in response to signaling from the user application_for communicating with the optical communication network and providing application-specific_optical communication network bandwidth management services for the user application, including provision of a new optical communication path between specified nodes in the optical communication network; and

an optical service server operative to authenticate the user application and to obtain network topological information which is employed on behalf of the optical service agent for providing bandwidth management services such that the network topological information is not exposed to the user application.

13. (original) The device of claim 12, wherein the optical service agent comprises:

a user-to-network interface (UNI) for interfacing with the optical communication network;

a peer-to-peer interface for interfacing with peer users; and optical service logic for interacting with the optical communication network via the UNI and with the peer users via the peer-to-peer interface for providing said bandwidth management services for the user application.

14. (original) The device of claim 13, wherein the optical communication network comprises an automatically switched optical/transport network (ASON), and wherein the UNI comprises an ASON UNI.

15. (original) The device of claim 13, wherein the optical service logic comprises:

bandwidth monitoring logic for monitoring bandwidth utilization on a connection.

16. (original) The device of claim 13, wherein the optical service logic comprises:

bandwidth controlling logic for controlling bandwidth utilization on a connection.

17. (original) The device of claim 13, wherein the optical service logic comprises:

bandwidth obtaining logic for obtaining additional bandwidth for a connection.

18. (original) The device of claim 13, wherein the optical service logic comprises:

bandwidth relinquishing logic for relinquishing excess bandwidth for a connection.

19. (original) The device of claim 13, wherein the optical service logic comprises:

bandwidth allocation logic for allocating bandwidth among multiple connections.

20. (original) The device of claim 16, wherein the bandwidth controlling logic is operably coupled to prevent bandwidth utilization on the connection from exceeding a predetermined maximum bandwidth utilization.

21. (original) The device of claim 17, wherein the bandwidth obtaining logic is operably coupled to obtain the additional bandwidth for the connection upon determining that bandwidth utilization on the connection exceeds a predetermined level.

22. (original) The device of claim 18, wherein the bandwidth relinquishing logic is operably coupled to relinquish excess bandwidth for the connection upon determining that bandwidth utilization on the connection is below a predetermined level.

23. (original) The device of claim 19, wherein the bandwidth allocation logic is operably coupled to identify an over-utilized connection and an underutilized connection and to transfer traffic from the over-utilized connection to the under-utilized connection.

24. (previously presented) A system comprising:

an optical communication network in which data is processed and transported only in optical form;

a first network user coupled to the optical communication network, wherein the first network user comprises an optical service agent operative in response to signaling from a user application to obtain application-specific optical communication services from the optical communication network via a user-to-network interface (UNI) communicating with the optical communication network and for providing application-specific bandwidth management services for the first network user, including provision of a new optical communication path between specified nodes in the optical communication network; and

an optical service server operative to authenticate the first network user and to obtain network topological information which is employed on behalf of the optical service agent for providing bandwidth management services such that the network topological information is not exposed to the first network user.

25. (original) The system of claim 24, wherein the optical communication network comprises an automatically switched optical/transport network (ASON), and wherein the UNI comprises an ASON UNI.

26. (original) The system of claim 24, wherein the optical service agent is operably coupled to monitor bandwidth utilization on a connection.

27. (original) The system of claim 24, wherein the optical service agent is operably coupled to control bandwidth utilization on a connection.

28. (original) The system of claim 24, wherein the optical service agent is operably coupled to obtain additional bandwidth for a connection.

29. (original) The system of claim 24, wherein the optical service agent is operably coupled to relinquish excess bandwidth for a connection.

30. (original) The system of claim 24, wherein the optical service agent is operably coupled to allocate bandwidth among multiple connections.

31. (previously presented) A method for managing bandwidth for a user in an optical communication system in which data is processed and transported only in optical form, the-method comprising:

monitoring bandwidth utilization by an optical service agent in the user on a connection in the optical communication system;

controlling bandwidth utilization by an optical service agent in the user on a connection in the optical communication system in response to signaling from a user application to provide application-specific bandwidth utilization control;

obtaining additional bandwidth by an optical service agent in the user for a connection in the optical communication system in response to signaling from the user application to provide application-specific additional bandwidth, including provision of a new optical communication path between specified nodes in the optical communication system;

relinquishing unused bandwidth by an optical service agent in the user for a connection in the optical communication system in response to signaling from the user application to provide application-specific relinquishing of bandwidth; and

allocating bandwidth by an optical service agent among multiple connections in the optical communication system,

prior to which an optical service server executes the following steps:

authenticating the user;

obtaining network topological information; and

employing the network topological information on behalf of the optical service agent to provide bandwidth management services such that the network topological information is not exposed to the first network user.

32. (original) The method of claim 31, wherein controlling bandwidth utilization on a connection comprises:

monitoring bandwidth utilization on the connection;

determining that the bandwidth utilization has exceeded a predetermined level; and

taking an action to prevent the bandwidth utilization from exceeding a predetermined maximum bandwidth utilization.

33. (original) The method of claim 32, wherein taking an action to prevent the bandwidth utilization from exceeding a predetermined maximum bandwidth utilization comprises dropping packets.

34. (original) The method of claim 31, wherein obtaining additional bandwidth for a connection comprises:

monitoring bandwidth utilization on the connection;

determining that the bandwidth utilization has exceeded a predetermined level; and

obtaining additional bandwidth for the connection.

35. (original) The method of claim 31, wherein relinquishing unused bandwidth for a connection comprises:

monitoring bandwidth utilization on the connection;

determining that the bandwidth utilization is below a predetermined level; and

relinquishing excess bandwidth for the connection.

36. (original) The method of claim 31, wherein allocating bandwidth among multiple connections comprises:

monitoring bandwidth utilization on a number of connections;

identifying an over-utilized connection and an under-utilized connection; and

transferring traffic from the over-utilized connection to the underutilized connection.

Appendix B - Evidence Submitted

None.

Appendix C - Related Proceedings

None.